

ABSTRACT

A semiconductor device fabricating method includes an amorphous silicon laminating process for forming an amorphous silicon film (2) on a substrate (1), an
5 irradiation process for irradiating the amorphous silicon film (2) with laser light (16) to transform at least a part of the amorphous silicon film (2) into a polycrystalline silicon film, and an oxidation process for oxidizing the surface of the polycrystalline silicon film in an atmosphere including oxygen, after the irradiation process. Herein, the laser light
10 (16) is a linear beam having an energy-density gradient of at least $3 \text{ (mJ/cm}^2\text{)}/\mu\text{m}$ or more in the widthwise direction, and the linear beam is generated by transforming pulse laser light with a wavelength in a range between 350 nm or more and 800 nm or less. The oxidation process is performed in an atmosphere of saturated water vapor under a pressure of 10 atmospheric pressures or more and at a temperature in a range between
15 500°C or more and 650°C or less. With this method, a semiconductor device with excellent crystallinity can be easily fabricated.